

ESCAPE BEHAVIOUR OF INSECTS ON FIRE-BLACKENED TREE TRUNKS IN EAST GIPPSLAND

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Abstract

Escape mechanisms of 44 insect species observed on fire-blackened tree trunks in dry sclerophyll forest at Granite Mountain, in East Gippsland are recorded.

Introduction

The dry sclerophyll forests of East Gippsland have always been subject to the influence of fires. These fires originally were the result of natural occurrences such as lightning strikes or the occasional use of fire by aborigines. Settlement by Europeans in these areas for the purpose of raising stock meant that the forests were burnt more often than before. It was found that an interval of five years between fires was optimal as it allowed for the accumulation of sufficient forest litter to ensure a successful burn. Forage growth was promoted by these fires and systematic forest burning became an established farming practice (McKinty 1969).

Current management practices used by the Victorian Forests Commission include the use of fuel reduction burning to an extent necessary to prevent the spread of large wildfires. These low intensity fires are carried out mostly during autumn, using either ground or aerial ignition techniques (Anonymous 1981).

We collected insects from fire-blackened tree trunks at two sites (1 and 2) at Granite Mountain, approximately 40 km north of Cann River in East Gippsland, Victoria from 3-16 January 1982. Both sites had experienced a fire nine months prior to our study.

Site 1 was a dry ridge top with a mixed dry sclerophyll forest predominantly consisting of *Eucalyptus sieberi* (silver top), but also including *Eucalyptus obliqua* (messmate), *Eucalyptus globoidea* (white stringybark) and *Eucalyptus fastigata* (cut tail).

Site 2 was an alluvial creek flat which also had a mixed dry sclerophyll forest. The main tree species were *E. globoidea* and *E. cypellocarpa*. Minor species present were *E. sieberi* and *Eucalyptus radiata* (narrow leaf peppermint).

Insects were collected from tree trunks either directly into glass vials with the aid of jewellers forceps or by means of a hoop net. Observations on escape mechanisms were noted prior to collection of each specimen. Specimens from this study have been deposited in the Museum of Victoria, except for ants which were deposited in the Australian National Insect Collection.

TABLE 1
Insects collected from fire-blackened tree trunks in East Gippsland

Order	Family	Genus & Species	No. collected	Escape mechanism*
Coleoptera	Carabidae	<i>Adelotopus haemorrhoidalis</i> Er.	1	D
		<i>Promecoderus elegans</i> Cast.	1	D
	Alleculidae	<i>Anaxo cylindricus</i> Germ.	1	A
		<i>Tanychilus striatus</i> Newm.	1	A
	Buprestidae	<i>Nascio vetusta</i> Bois.	1	A
	Cerambycidae	Undetermined	1	A
	Curculionidae	<i>Aterpus tuberculatus</i> Gyll.	1	B
		<i>Cherrus</i> sp.	2	A
		<i>Rhinaria cultratus</i> (F.)	1	A
		<i>Tyrtaeosus</i> sp.	1	A
		<i>Conoderus nitidulus</i> Cand.	1	A
	Lagriidae	<i>Lagria grandis</i> Gyll.	2	D
	Melyridae	<i>Carphurus triimpressus</i> Lea	1	D
Diptera	Tabanidae	<i>Cydistomyia victoriensis</i> (Ric.)	1	C
	Tachinidae	<i>Macropodexia longipes</i> Macquart	2	C
		<i>Rutilia vivipara</i> (F.)	1	C
		<i>Senostoma</i> sp.	1	C
	Asilidae	<i>Laphria rufifemorata</i> Macquart	2	C
		<i>Neoitamus margitis</i> (Walker)	10	C
		<i>Neoitamus</i> sp.	1	C
Lepidoptera	Psychidae	Undetermined (2 spp.)	3	F
Hemiptera	Achilidae	Undetermined (3 spp.)	3	D
	Cicadellidae	Undetermined	1	D
	Cicadidae	Undetermined	1	C
	Eurybrachyidae	<i>Platybrachys</i> sp.	1	D
	Lygaeidae	<i>Daerlac</i> sp.	2	D
	Pentatomidae	<i>Diemenia rubromarginata</i> (Guer.)	2	D
	Reduviidae	<i>Stenolemus edwardsii</i> (Bergr.)	1	E
Hymenoptera	Anthophoridae	<i>Exoneura</i> sp.	1	C
		<i>Camponotus</i> sp.	1	E
	Formicidae	<i>Crematogaster</i> sp.	1	E
		<i>Iridomyrmex</i> sp. (2 spp.)	4	E
		<i>Myrmecia pilosula</i> (Fr. Smith)	3	E
		<i>Myrmecia</i> sp. (2 spp.)	3	E
		<i>Podomyrma</i> sp.	1	E
		<i>Polyrhachis</i> sp. (2 spp.)	2	E
		<i>Rhytidoponera tasmaniensis</i>	1	E
		Undetermined	1	C
Blattodea	Blattellidae	Undetermined	1	C

- * A. Remaining stationary (often in crevices), relying on camouflage to avoid detection.
 B. Becoming immobile (retracting legs) and dropping to the ground.
 C. Taking flight.
 D. Running and/or jumping across the bark surface.
 E. Roving freely over the bark, relatively undisturbed by attempts at capture, but employing biting and/or stinging mechanisms upon capture.
 F. Living within the protection of a web or case.

Results and discussion

Observations from sites 1 and 2 have been combined as the two collection sites were not sufficiently different from one another and this study too small to allow for valid comparisons to be made. A list of the species collected, along with escape mechanisms observed prior to capture of each specimen is given in Table 1.

The escape mechanisms listed in Table 1 give only a general indication of the ability of each species to avoid capture. A species may often rely on several different strategies in order to avoid predation.

Many of the species collected were black or dark brown in colour enabling them to blend with the fire-blackened bark. In addition, some of these species possessed spines and protuberances which further assisted in camouflaging them against the rough texture of the bark. A particularly striking example of this feature was seen in the weevil, *Aterpus tuberculatus*.

Adult asilids, tabanids and tachinids align their bodies vertically, often facing downwards when resting on the black trunks. This makes it even more difficult to distinguish the outlines of their black bodies against the vertical fissures of the bark. The orientation of these insects also assists in regulating body temperature. Dark insects have been shown to absorb more solar radiation than lighter coloured insects. By varying their body orientation these insects can control their body temperatures (Chapman 1975).

Daerlac sp. mimics ants of the genus *Camponotus* in body shape, colouration and movement, the latter which were also collected in this study.

The findings of this study suggest that many insects have successfully utilized the microhabitats provided by burnt tree trunks. It seems likely that predators such as birds would have played an important role in influencing these insects. Escape mechanisms amongst these insects vary greatly and in some instances a species may employ several mechanisms, resulting in increased protection.

Additional collecting from fire-blackened tree trunks will reveal the presence of many more species. Numerous microlepidopteran adults and spiders were observed during our study but were not collected due to difficulty in obtaining identifications.

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